Hand operated screen seed cleaner, DIY

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https://sites.google.com/view/low-tech-farm-tools

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Introduction

This hand operated screen seed cleaner separates seeds from chaff by size (seed width). Seed and smaller materials drop through the screen into a tote bin below. Larger materials (leaves, stems, pods and debris) retained by the screen discharge over the front edge of the screen, outside the tote bin. Or, small particles (small weed seeds, sand and grits) drop through the screen into a tote bin below; and larger seeds and chaff retained by the screen discharge over the front edge of the screen, outside the tote bin. This screen seed cleaner does not use a motor or engine, and does not have a feed hopper, air separator or elevated frame.

The screen seed cleaner has a rocking cradle that supports a screen; a stationary frame; and 4 pivoting struts that connects cradle to frame. Four springs are attached to the pivoting struts to assist in conservation of momentum as the cradle and screen oscillates back and forth.

The dimensions of the screen cleaner can be made larger or smaller; depending on size of tote bin used to catch the material passing through the screen.

Figure 1. Manually operated screen seed cleaner

Description

The screen seed cleaner has a cradle which holds 1 or 2 screens (Figure 1 and 2); a frame to support the horizontally oscillating cradle and screen (Figure 1, 3 and 4); 4 extension springs to conserve momentum of the oscillating cradle (Figure 5); and bronze sleeve bearings inserted into the pivoting struts to reduce friction in the 8 bolts that connects cradle to frame.

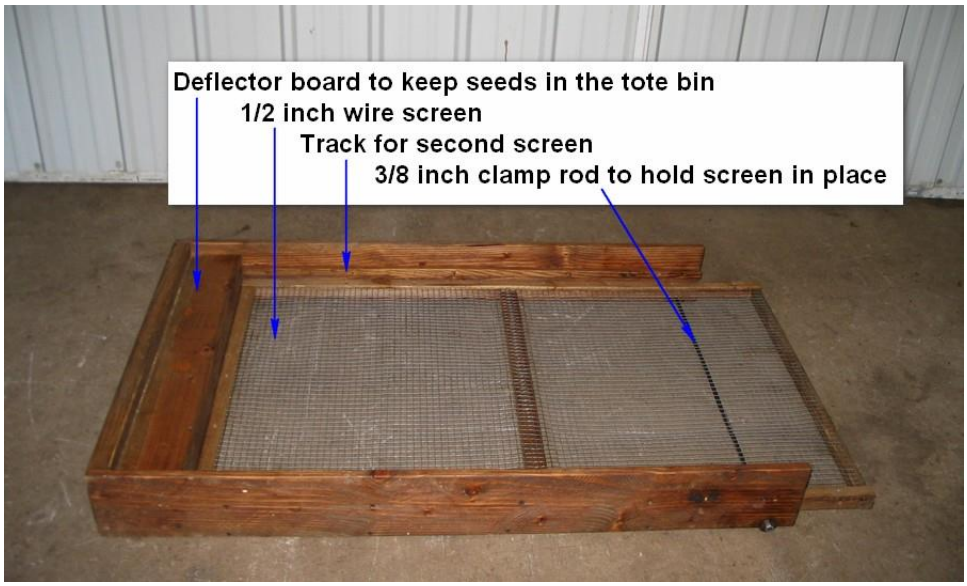
Deflector board to keep seeds in the tote bin
1/2 inch wire screen
Track for second screen
3/8 inch clamp rod to hold screen in place

Figure 2. Cradle with ½ inch wire screen

Figure 3. Frame with chains to adjust spring tension.

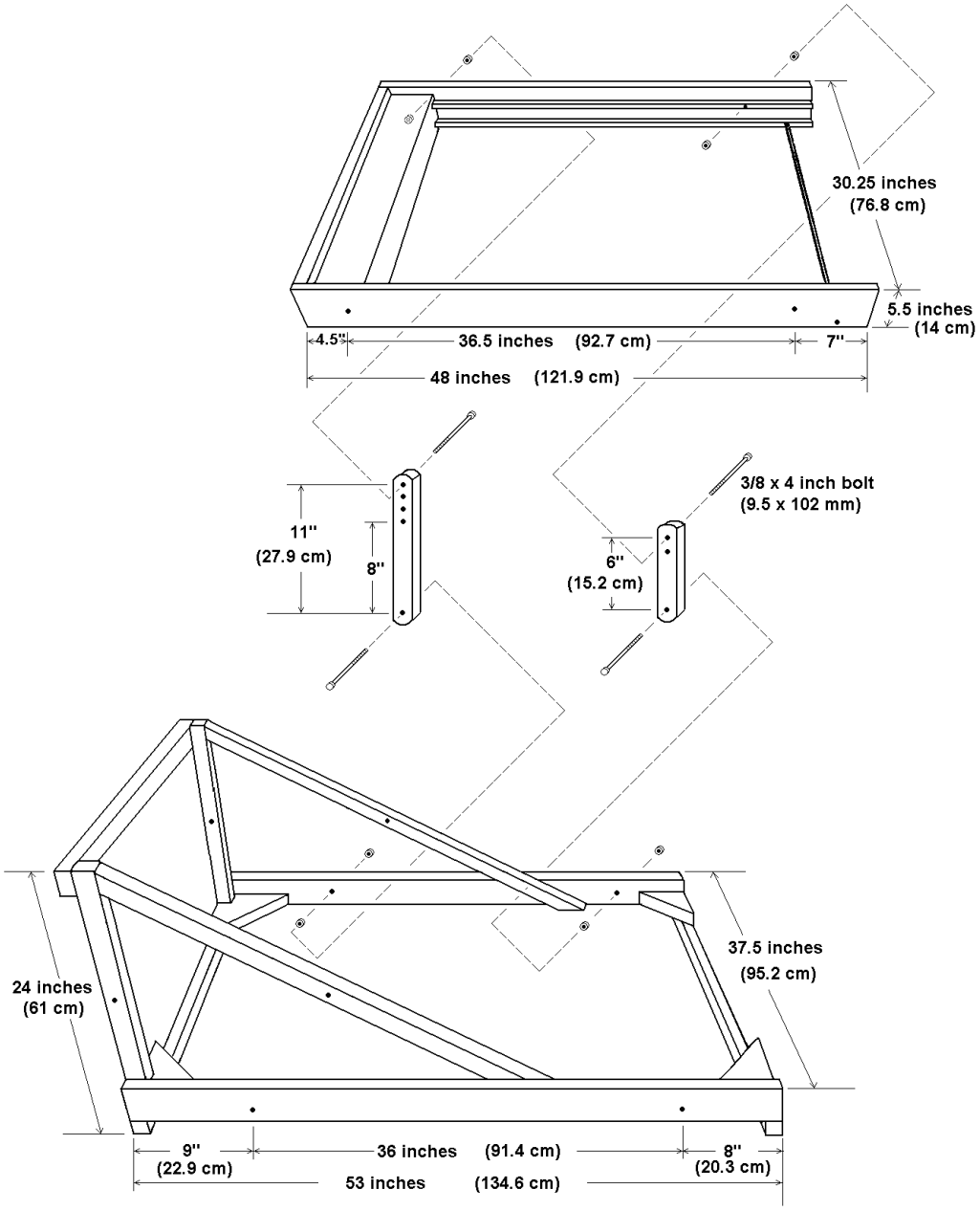

Figure 4. Hand operated screen seed cleaner, exploded diagram. Extension springs, chains and bronze sleeve bearings (inserted in the struts) not shown.

Dimensions: designed to sit on top of a 4 x 4 foot tote bin (Figure 6)

1. Cradle dimensions: 5 ½ " tall x 30 ¼" wide x 48" long (14 x 77 x 122 cm). It clamps the screen in position with a 3/8 inch (9.5 mm) rod.
2. Frame length = 53 inches (135 cm), overhangs the tote bin.
3. Frame width = 37 ½ inches (95 cm), narrower than the tote bin, to capture materials passing through the screen.
4. Extension springs available at 'Amazon', sold as 'trampoline springs': 15.5 pounds per inch load rate; 0.125" wire diameter x 1.075" outside diameter x 3.875" body length x 5.5 inch overall length (3.2mm wire x 27.3 mm diameter x 98 mm body length x 140 mm overall length). The springs provide a 2 inch (5 cm) oscillation when sifting 40 pounds (18 kg) of seed.
5. Screen slope: adjustable, 0.08 to 0.17. Steeper slope is used when scalping off large chaff.
6. Construction materials: 2x4, 2x2 and 1x6 lumber, cut to size.

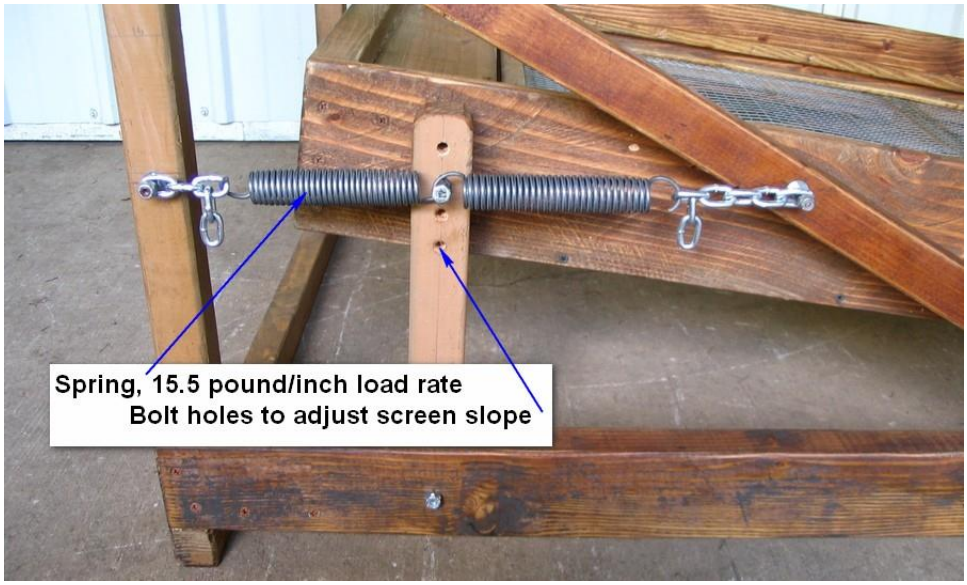

Figure 5. Extension springs, close-up. Strut with 4 bolt holes adjusts the slope of the cradle with screen.

Figure 6. Hand operated screen seed cleaner elevated on a tote bin to collect seeds that pass through the screen.

References

Engine driven screen seed cleaner designs that were examined while building this hand operated screen seed cleaner:

1. Clipper 109A. AT Ferrell, Saginaw, MI; Bluffton, IN.
2. Hance Model 36 Super Speed Scalper. The Hance Corporation, Westerville, Ohio.
3. IRRI Portable Grain Cleaner GC7. The International Rice Research Institute, Manila, Philippines.

Technical assistance:

Larry Fisher, Totally Recycled Materials, Davis California